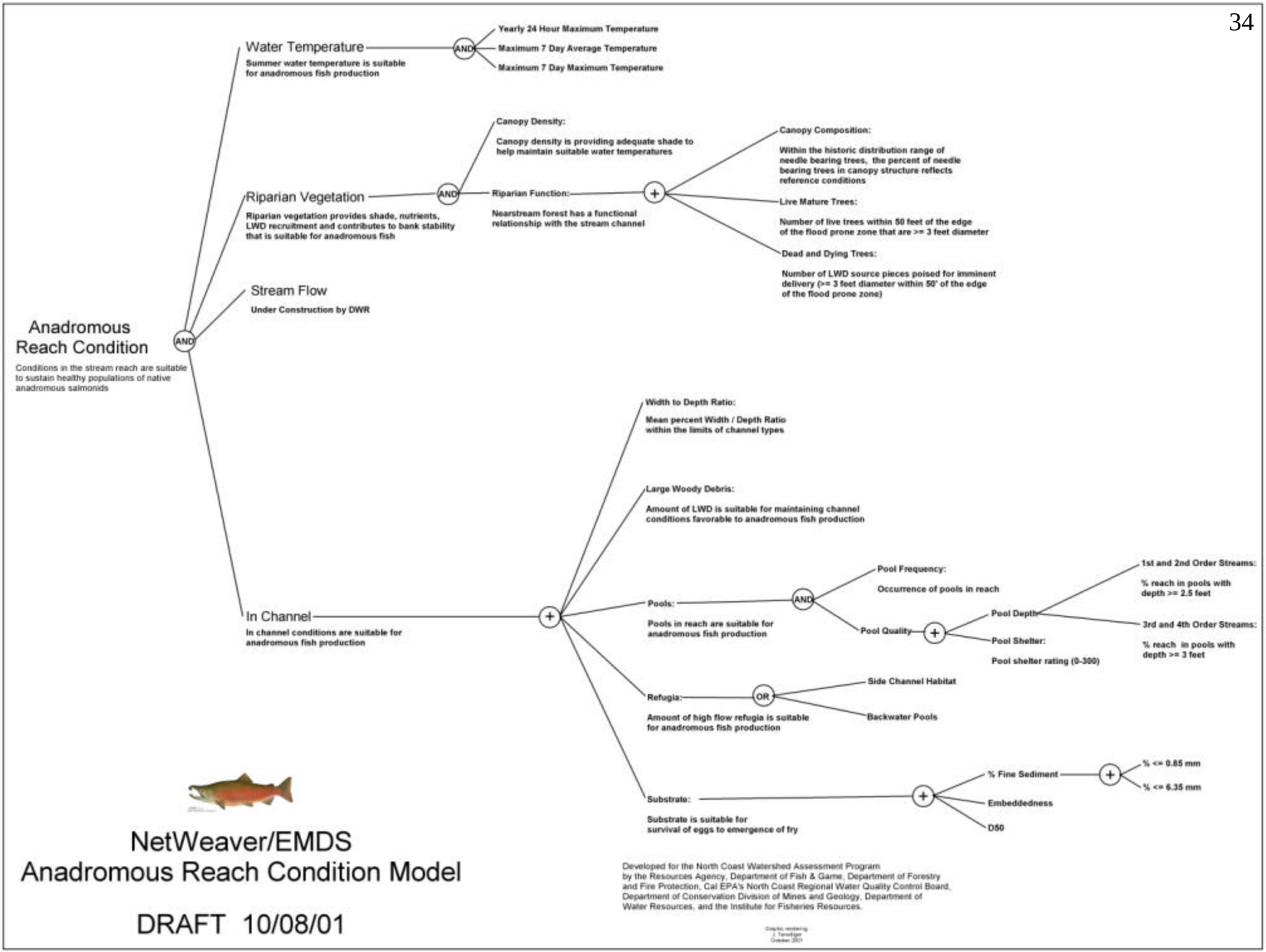
North Coast Watershed Assessment Program

DRAFT

Redwood Creek Watershed Synthesis Report

The mission of the North Coast Watershed Assessment Program is to conserve and improve California's north coast anadromous salmonid populations by conducting, in cooperation with public and private landowners, systematic multi-scale assessments of watershed conditions to determine factors affecting salmonid production and recommend measures for watershed improvements.

Public Review Draft



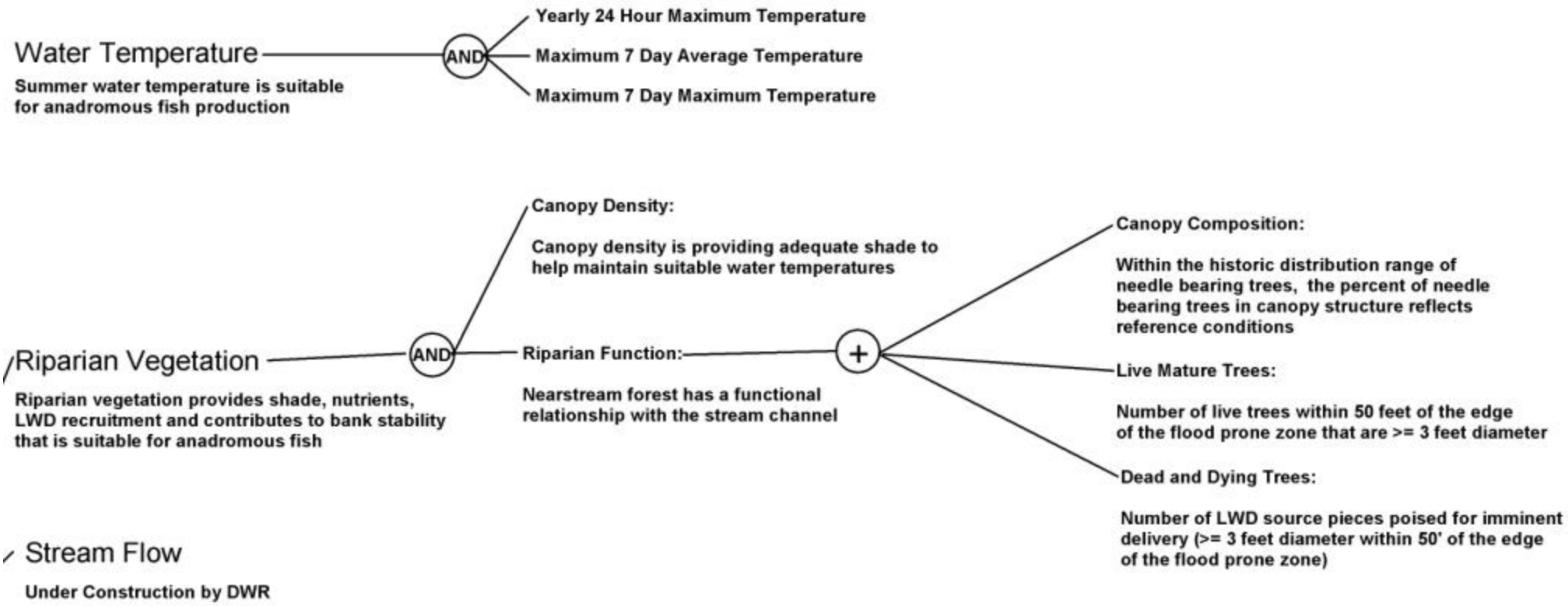
NetWeaver/EMDS
Anadromous Reach Condition Model

DRAFT 10/08/01

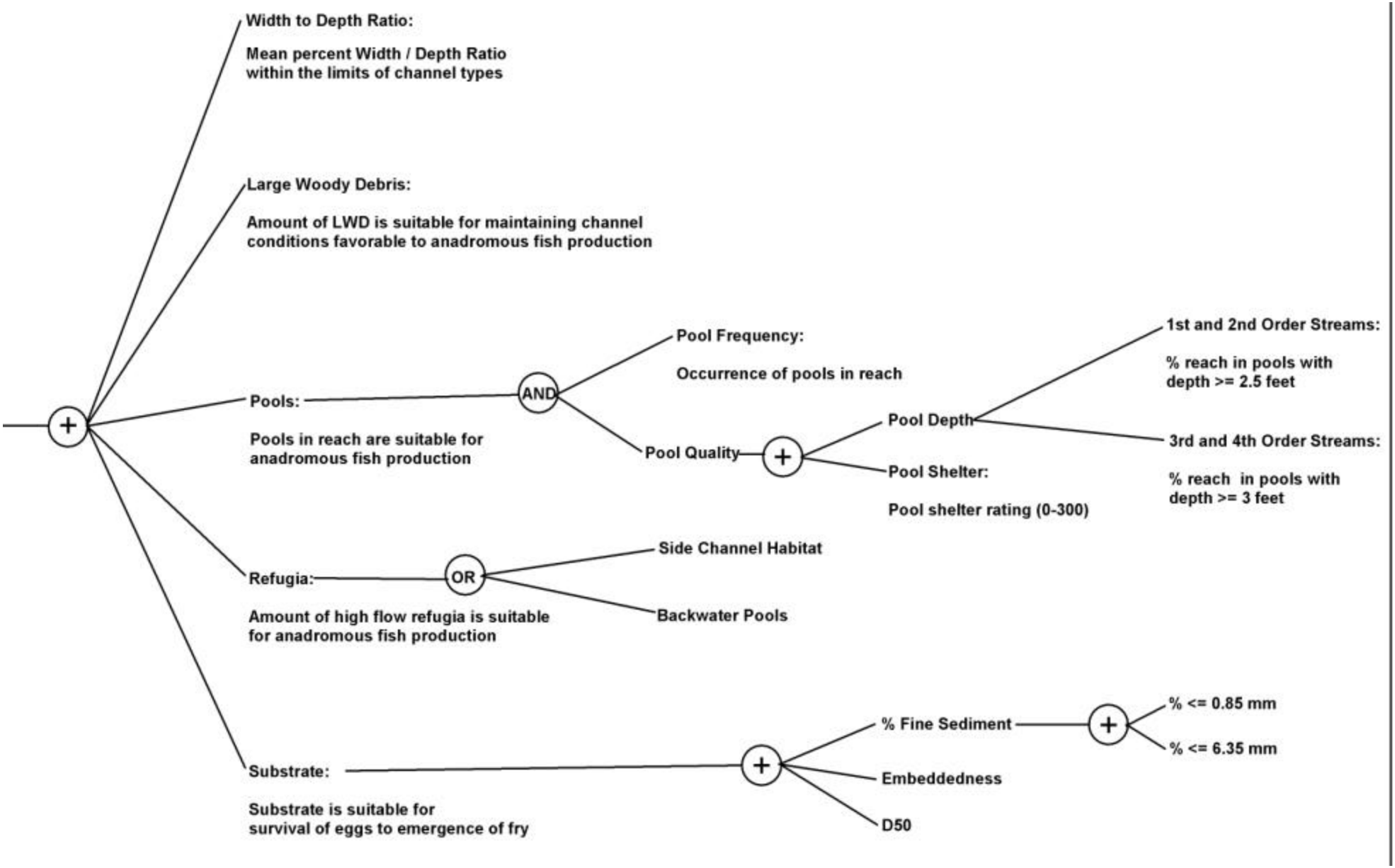
Developed for the North Coast Watershed Assessment Program
by the Resources Agency, Department of Fish & Game, Department of Forestry and Fire Protection, Cal EPA's North Coast Regional Water Quality Control Board, Department of Conservation Division of Mines and Geology, Department of Water Resources, and the Institute for Fisheries Resources.

Graphic rendering
J. Terwilliger
October 2001

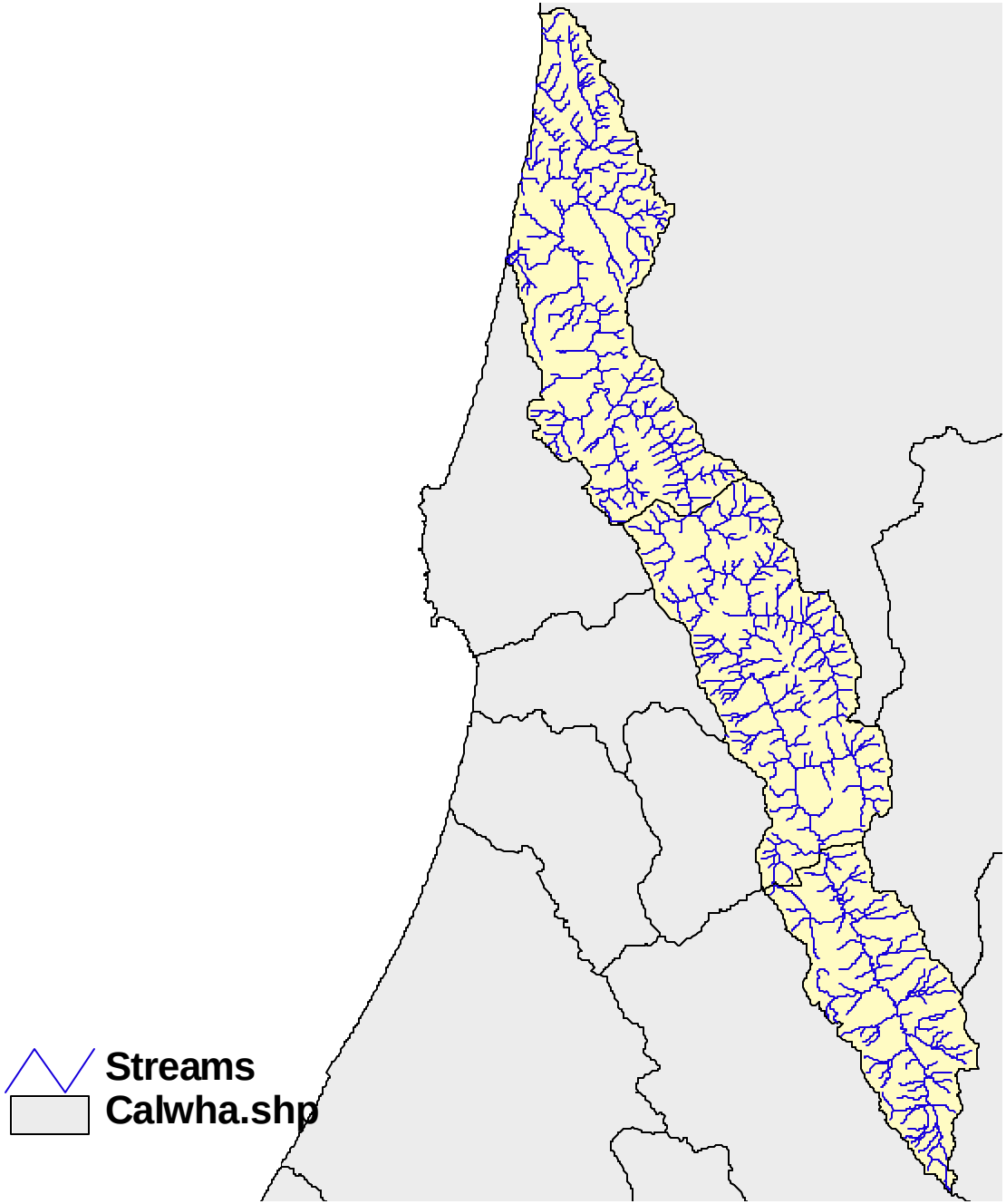
Stream Reach EMDS Logic Network



In Channel Network

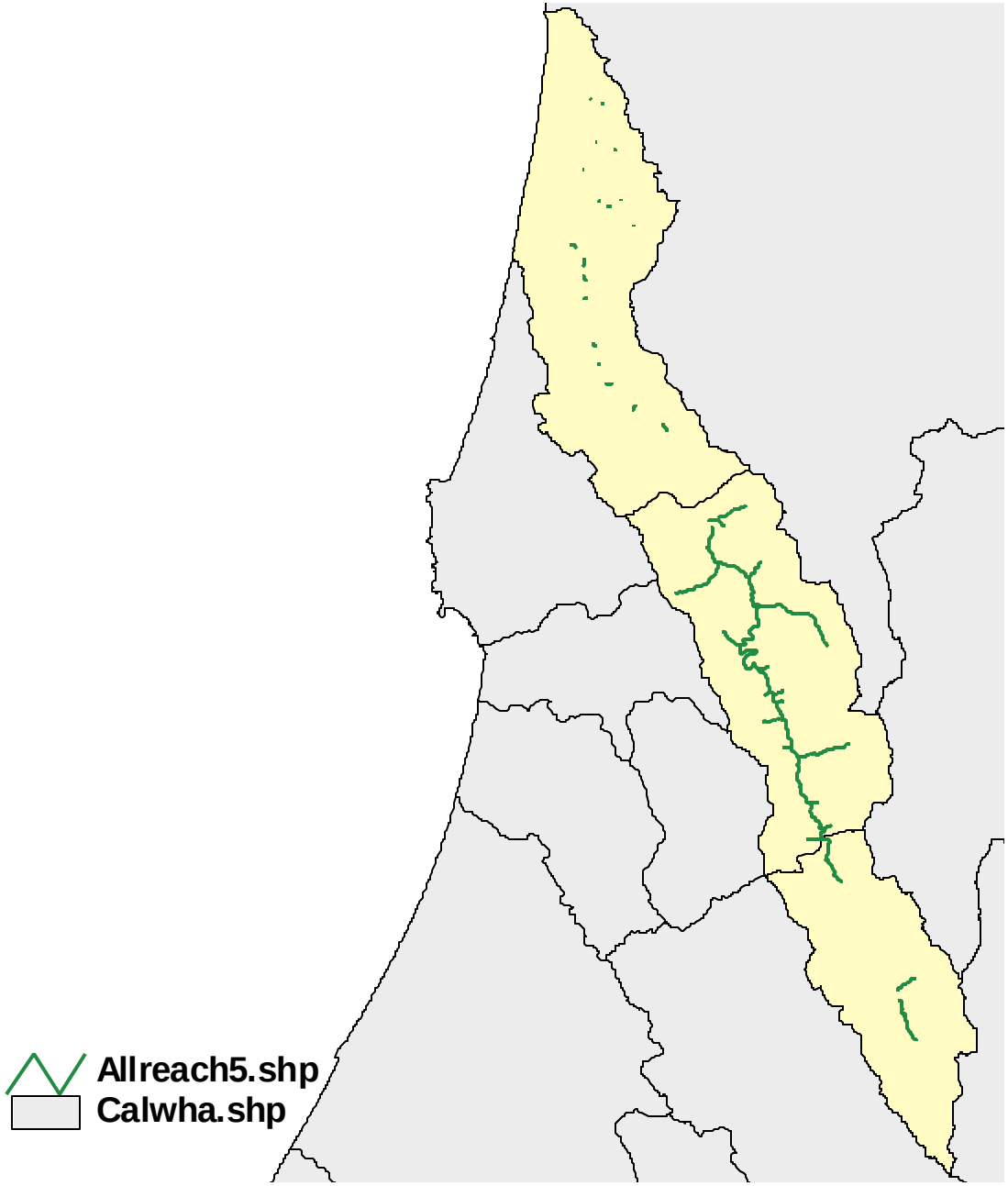


Stream Network



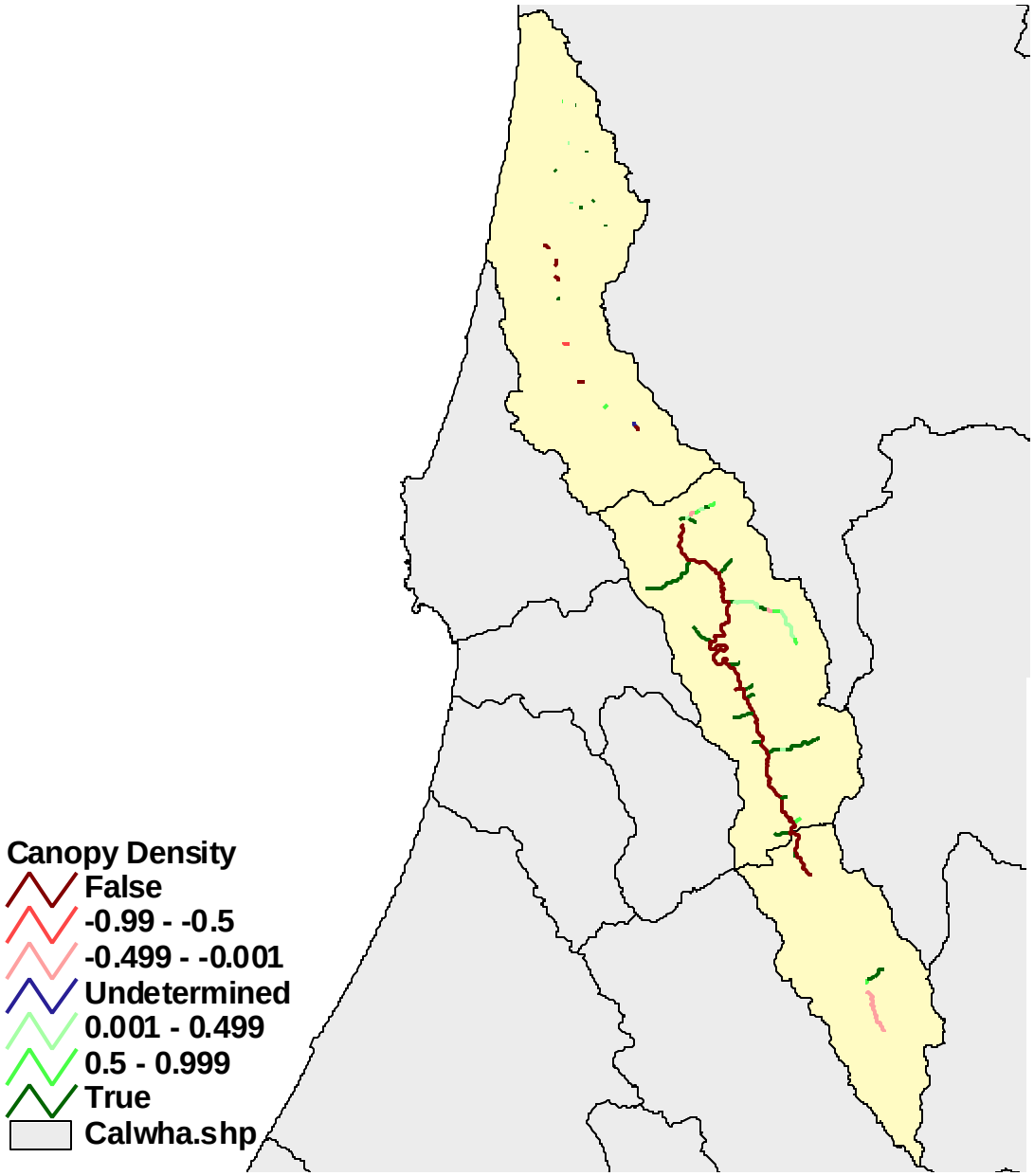
Stream network for Redwood Creek basin produced from 1:24,000 routed hydrography provided by CDF. This coverage was used to display results from the EMDS.

Sample & Survey Reaches



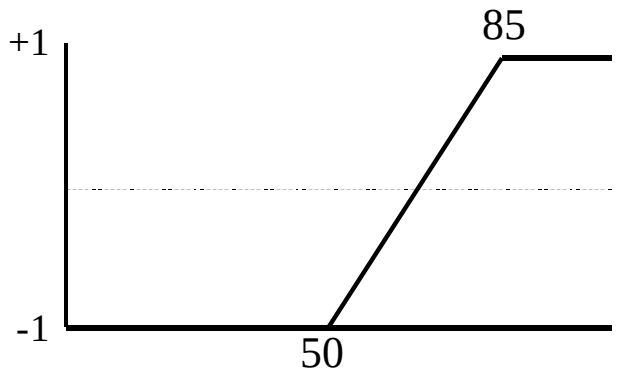
This map shows the sample and inventory reaches where DFG conducted stream surveys to provide data for the EMDS evaluation and assessment process. A random systematic sampling design was used to select a set of spatially balanced sampling points from the known distribution of anadromous salmonids within the Prairie Creek and Lower Redwood Creek subbasins.. Complete stream inventories were conducted in the Middle and Upper Redwood Creek Subbasins.

Canopy Density

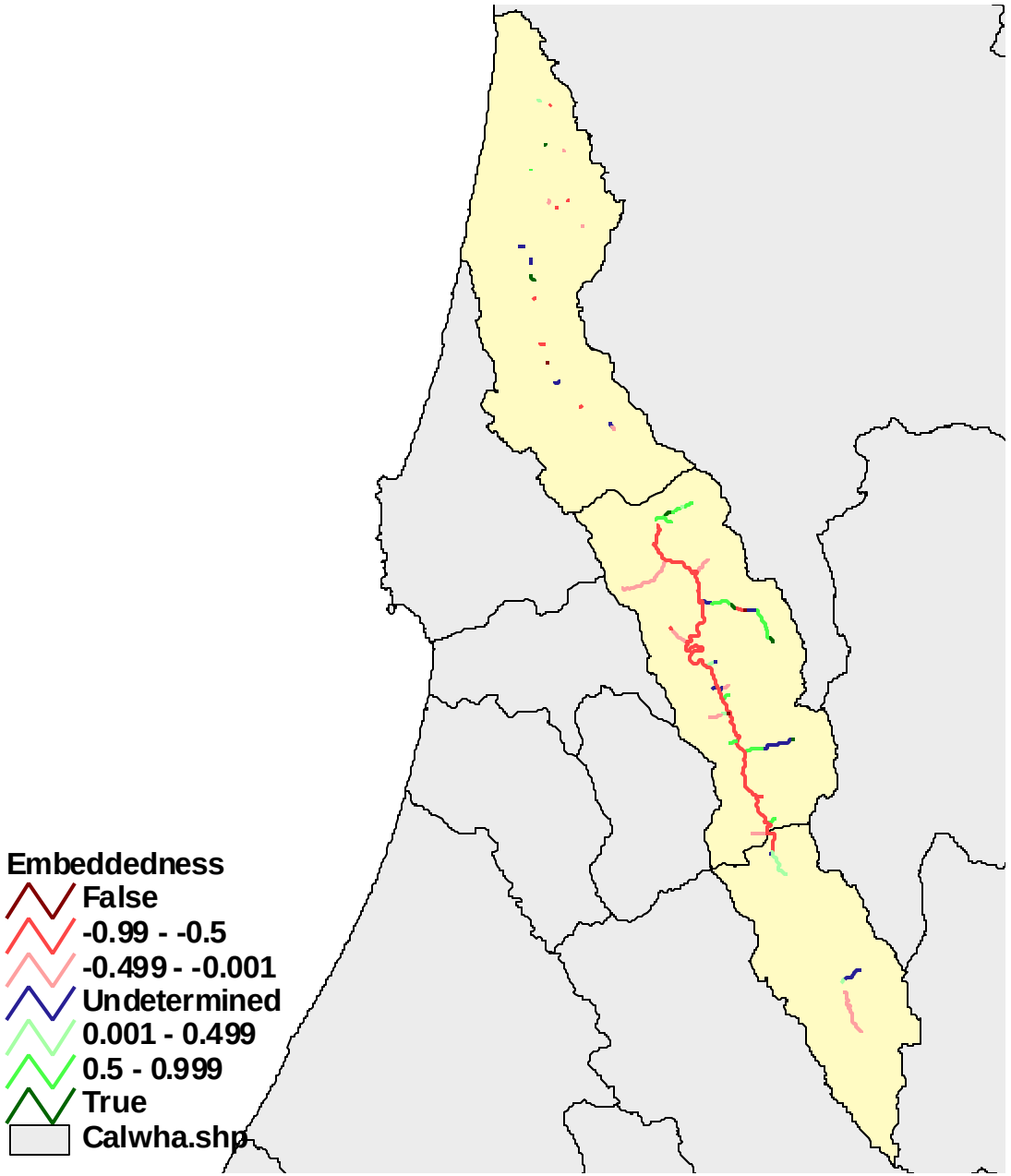


Definition: the average percent of the thalweg within a stream reach influenced by tree canopy.
Proposition: Canopy Density is functioning to provide adequate shade to help maintain suitable water temperature for anadromous salmonid production.
Evaluation: Canopy Density contributes to the Riparian Function network evaluation. 85% or greater Canopy Density evaluates to fully true. 50% or less evaluates to fully false

Percent Canopy Density



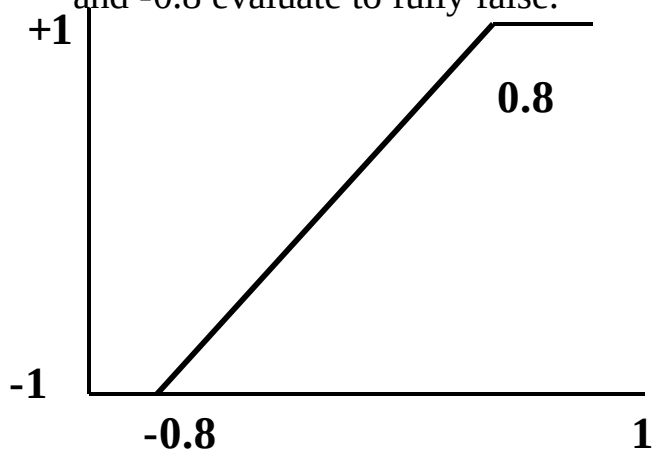
Embeddedness



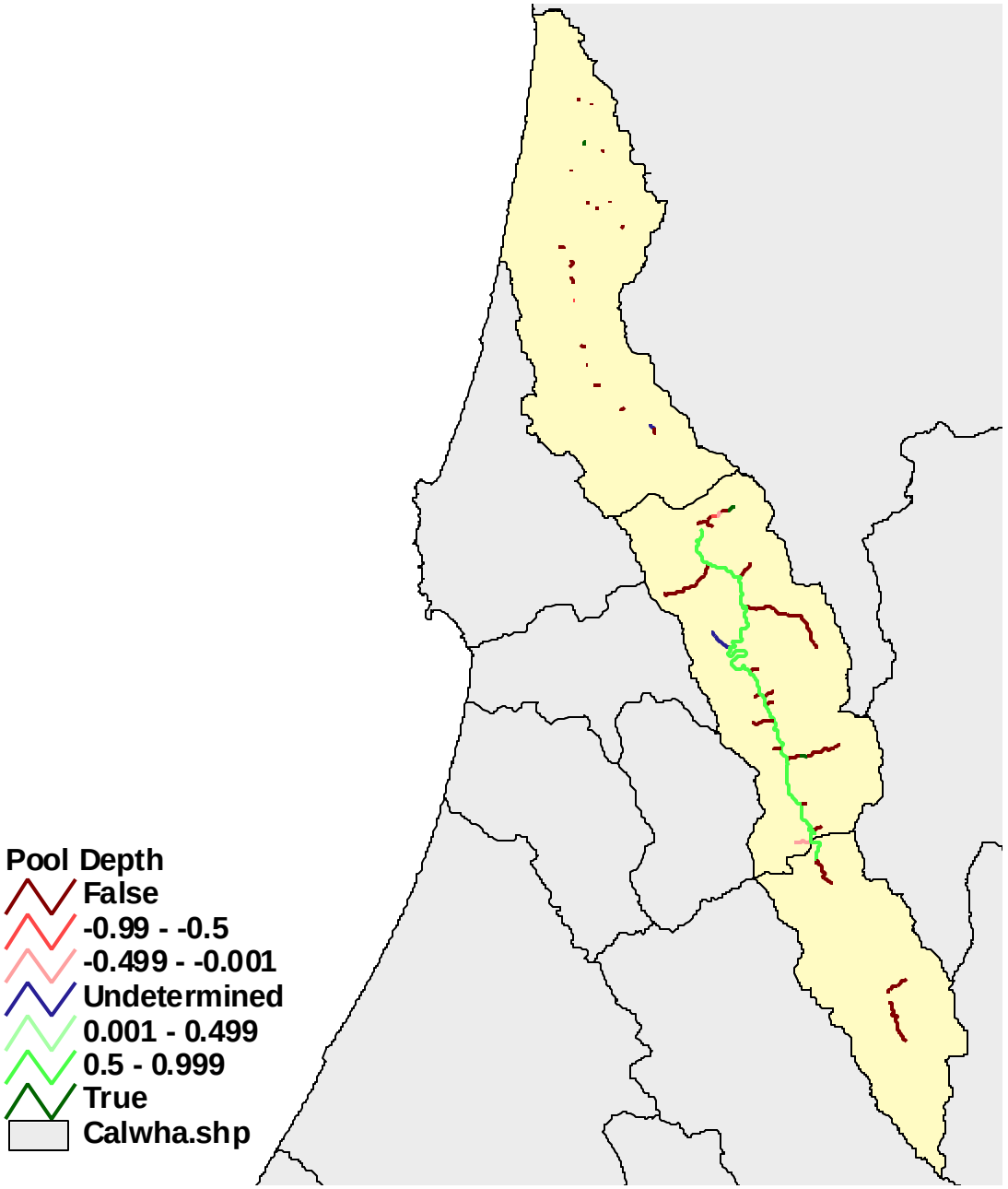
Definition: Pool tail embededdness is a measure of the percent of small cobbles (2.5" to 5" in diameter) buried in fine sediments. Embddedness is estimated on several individual cobble samples at pool tails sites. Embededdness measurements are used to help determine the suitability of pool tail sediments to support developing salmonid eggs and embryos until the emergence of fry.

Proposition: Pool tail spawning substrate is suitable for the survival of developing salmonid eggs and embryos until the emergence of fry.

Evaluation: EMDS calculates categorical embeddedness data to produce evaluation scores between –1 and 1. The proposition is fully true if evaluation sores are 0.8 or greater and -0.8 evaluate to fully false.



Pool Depth

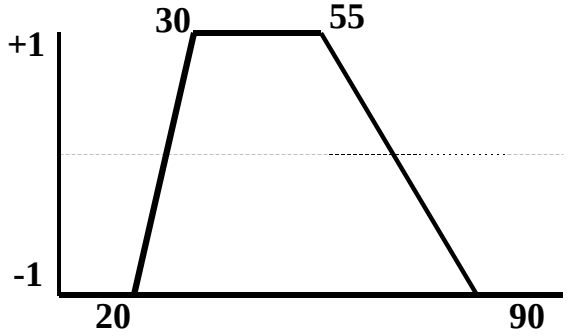


Definition: Primary pools are defined according to stream order. Primary pools have a maximum depth of 2.5 feet or greater in first and second order streams and have a maximum depth of 3 feet or greater for third and four feet ofr greater for fourth order streams. The percent reach of primary pools is calculated by the length of primary pool habitat / stream reach length.

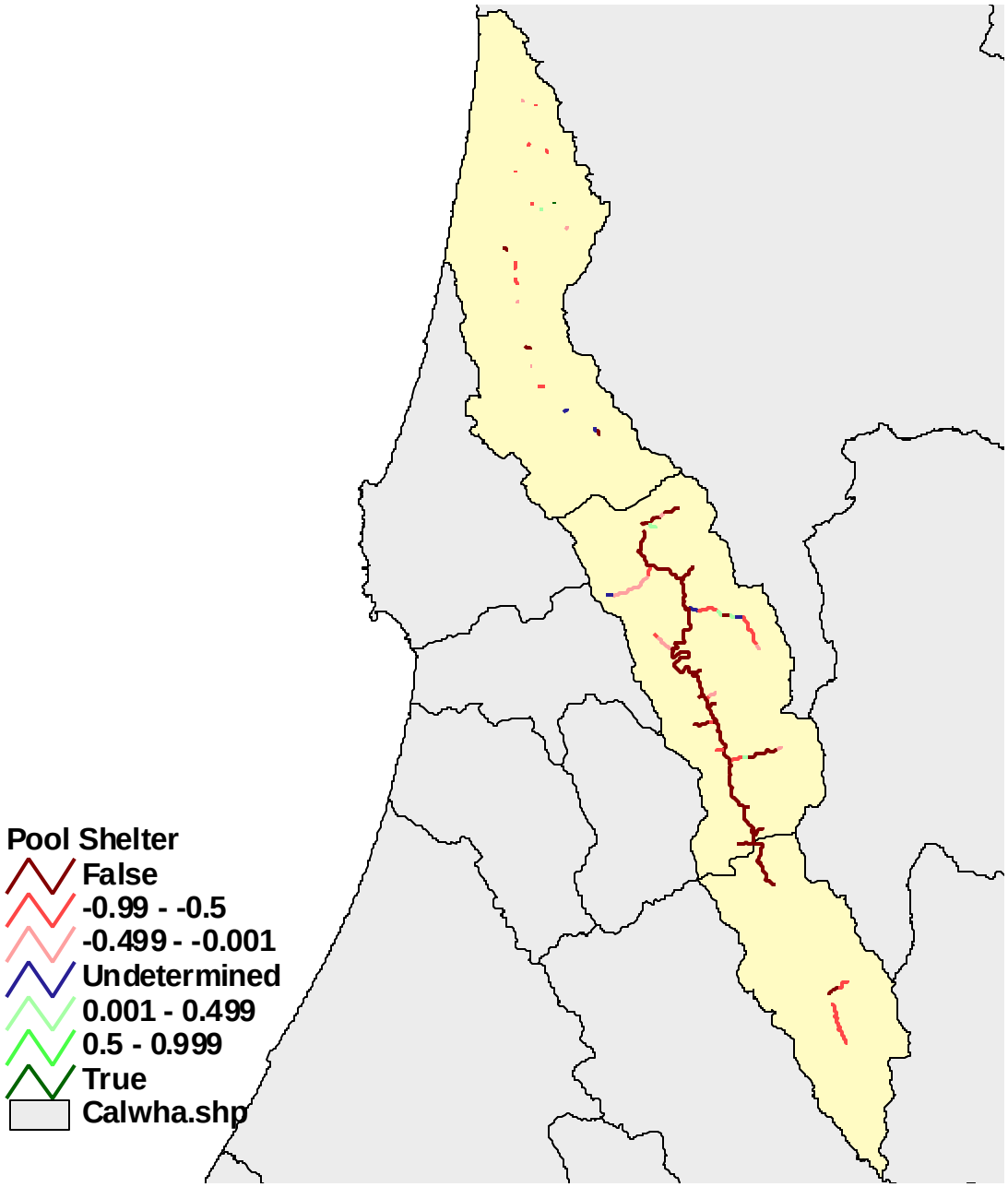
Proposal: The percent stream reach in primary pools is suitable for anadromous salmonid production.

Evaluation: Pool Depth contributes to the Pool Quality network evaluation. Pool Depth is fully true (+1)if 30-55% or fully false(-1) if less than 20% or greater than 90% of the stream reach is composed of primary pools.

Percent Reach in Primary Pools Reference Curve



Pool Shelter Complexity

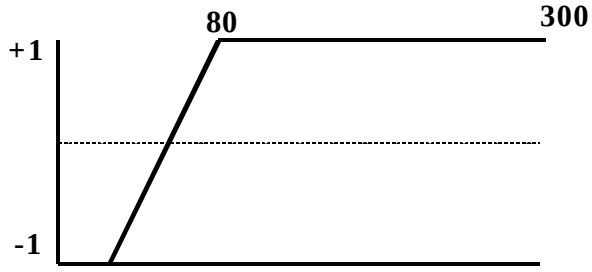


Definition: A DFG field procedure rates pool habitat shelter complexity (Flosi et al. 1998). The pool shelter rating is a relative measure of the quantity and composition of LWD, root wads, boulders, undercut banks, bubble curtain, and submersed or overhanging vegetation that serves as instream habitat, creates areas of diverse velocity, provides protection from predation, and separation of territorial units to reduce density related competition. The rating does not consider factors related to changes in discharge, such as water depth.

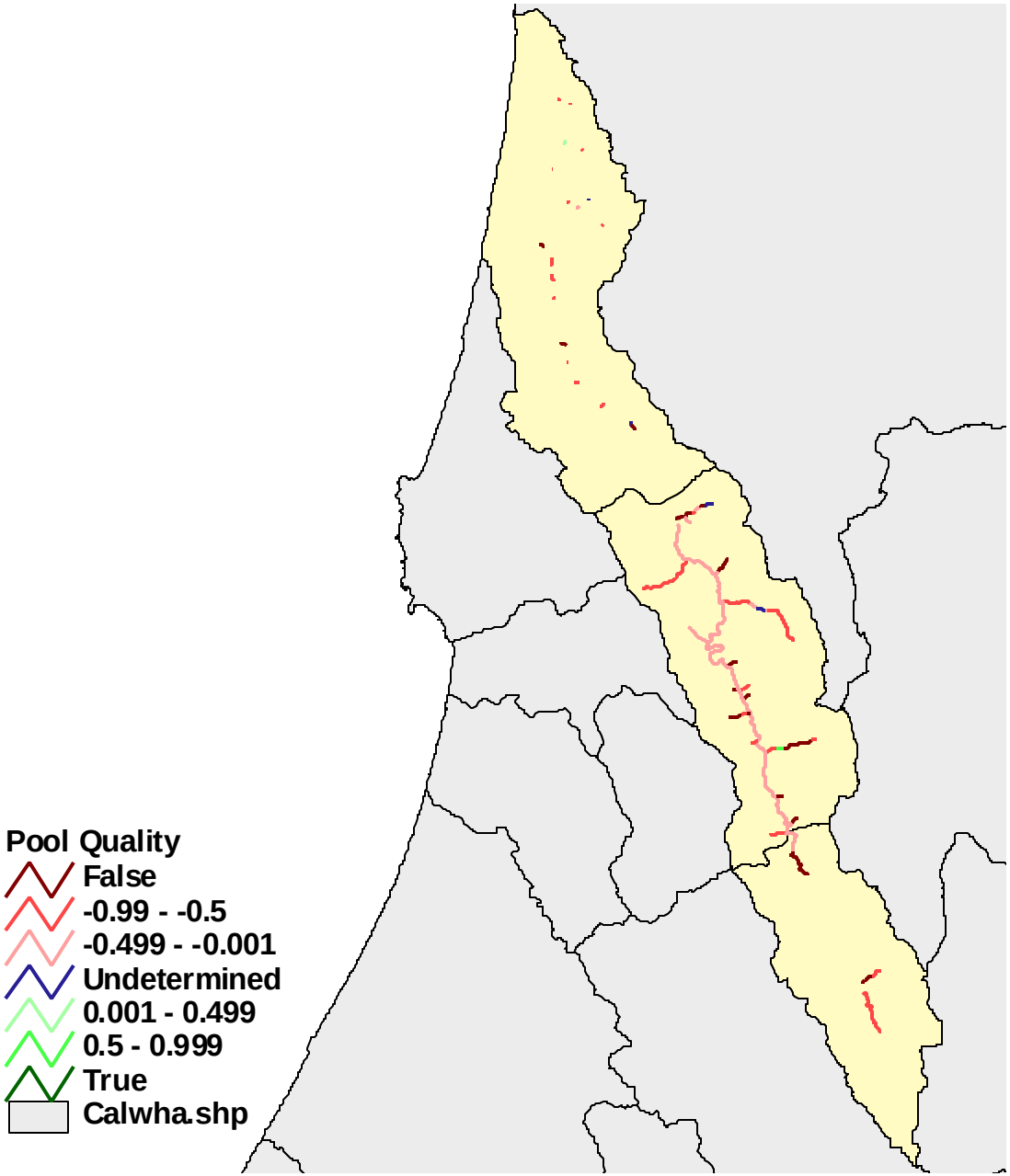
Proposal: Pool shelter complexity is suitable to provide the desired condition for anadromous salmonid production.

Evaluation: Pool Shelter Complexity contributes to the Pool quality network evaluation. Pool Shelter Complexity evaluates to fully true (+1) if the score is 80 or greater and fully false (-1) if the score is 30 or less.

Pool Shelter Complexity
Reference Curve



Pool Quality

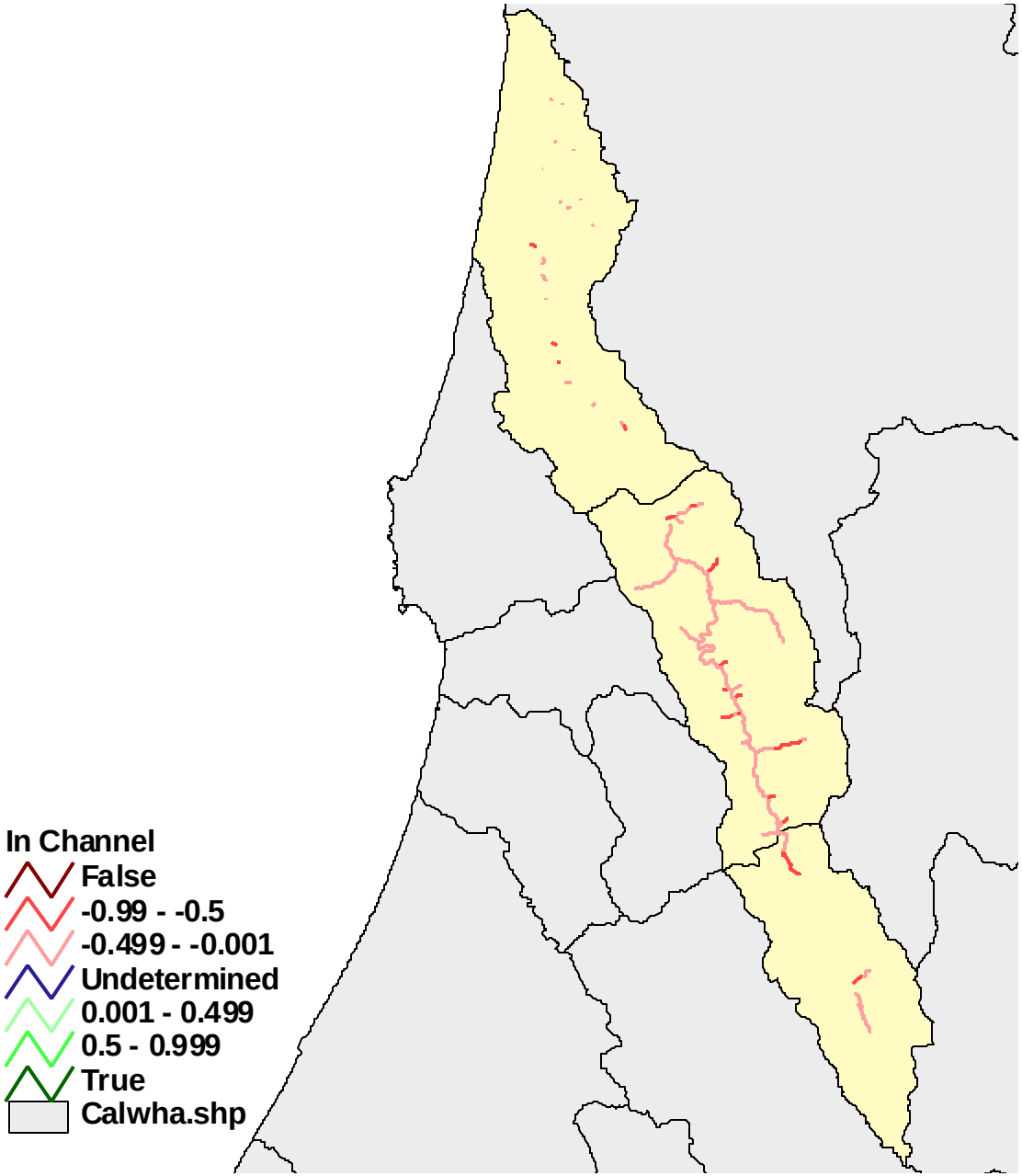


Definition: Pool Quality is a combined measure of Pool Depth and Pool Shelter Complexity.

Proposition: Pools provide the suitable depth and complexity to fully support anadromous salmonids.

Evaluation: Pool Quality is determined by the mean score returned from the combined evaluation of Pool Depth and Pool Shelter Complexity. A score of +1 evaluates the proposition to fully true and a score of –1 evaluates to fully false.

In Channel Condition



Definition: The In Channel Condition of each stream reach is a combined measure of environmental factors that occur within the stream channel.
Proposition: In-channel condition is fully suitable for anadromous salmonid production.

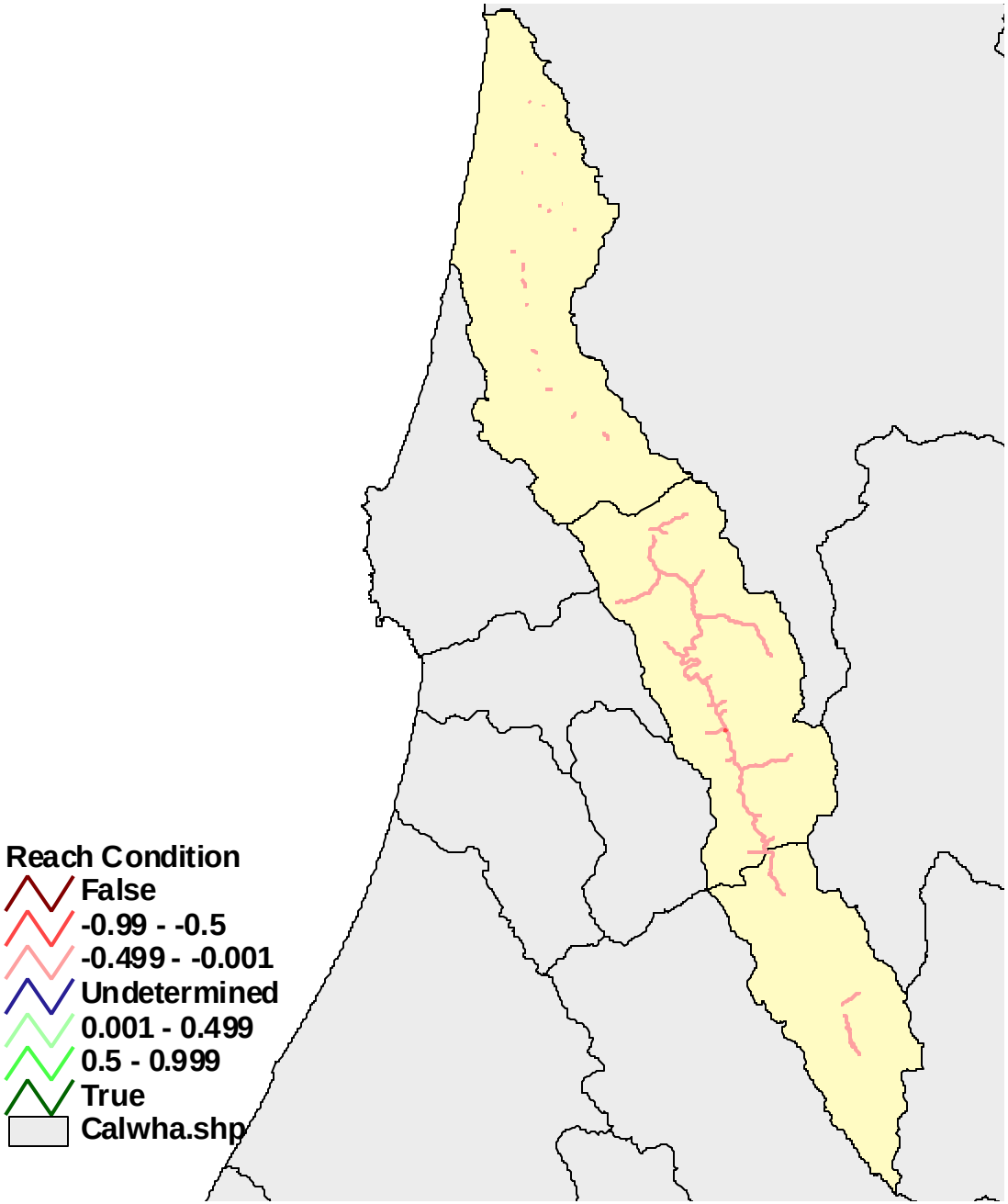
Evaluation: The In Channel Condition is determined by the mean score returned from the combined evaluation of :

Pool Condition
Refugia
Substrate Composition
Large Woody Debris
Width to depth Ratio

A score of +1 evaluates the proposition to fully true. A score of –1 evaluates to fully false.

Note: Some parameters needed to fully populate the In Channel network are missing. This leads to a conservative final evaluation score for In Channel Condition.

Reach Condition



Definition: The Reach Condition is composed of Four networks that that describe and evaluate anadromous salmonid conditions at the reach scale:
Water Temperatue
Riparian Vegetation
Stream Flow
In Channel

Proposition: The Reach Conditions are fully suitable to support healthy anadromous salmonid populations.

Evaluation: The Reach Condition presents the overall and final evaluation of the hierarchical evaluation of the EMDS model.
The final evaluation scores of the four networks are passed though an “AND” node. This means that the final Reach Condition evaluation is biased towards the lower scores. A score of +1 evaluates the proposition to fully true. A score of –1 evaluates to fully false.

Note: All the networks needed to fully populate the Reach Condition final evaluation are not available at this time. This leads to a conservative final evaluation score.